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Innovation in Economic Development, Ohio MEMS Association 2004 Economic Summit: The Business Case

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Innovation and Economic Development

Ohio MEMS Association

2004 Economic Summit: The Business Case

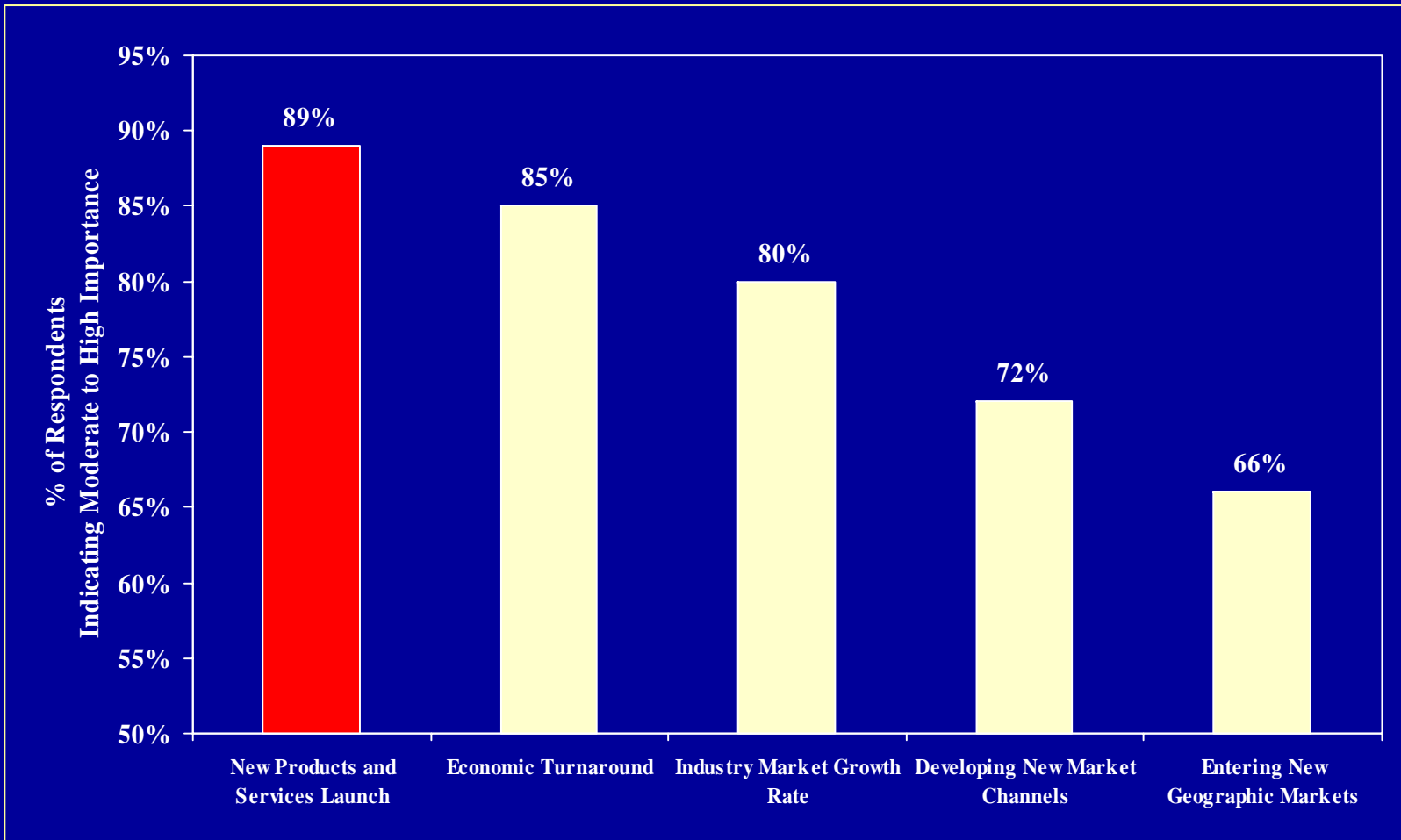
Edward W. (Ned) Hill

Professor and Distinguished Scholar of Economic
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TeamNeo

In a recent Deloitte survey, manufacturers across industries expect innovation to be a primary driver of growth over the next three years



Source: Deloitte & Touche Global Manufacturing Benchmark Survey

Seven Principles of Economic Development

Increases in earnings come from increases in productivity through the sale of goods and services

The Practice of Economic Development

Seven bumper stickers

1. It's about product; not jobs—
 - Employment is derived from product demand
2. Avoid rubeaphobia; think for yourself—
 - Economies are not built through jealousy or envy
3. Skepticism is good—
 - Do not assume or assert competitive strengths
4. Invest, don't spend—
 - Build economies from areas of strength while intentionally addressing weaknesses

The Practice of Economic Development

Seven bumper stickers

5. Focus on the basics; do the hard stuff—

- Think and act through the firm's cash statement

6. The Product Cycle is real—

- Product cycles affect strategy and implementation

7. Avoid silver bullet thinking—

- Think of technology and product development as a portfolio

Everyone wants high-tech operations...



... fight the allure of economic development fads; do not lose sight of true competitive advantage

The Economic Development Formula

- Productivity is the basis of economic development:
Increases in earnings come from increases in productivity through the sale of goods and services
- Formula to economic success maximizes regional value added
 - Produce highly valued products
 - With a great deal of capital
 - Mix in technologically sophisticated occupations with scarce knowledge-based regional resources that make the economy “sticky”

Innovation

-
- As products move along the product cycle market power and earnings diminish.
 - Industries reorganize and the employment base dies.
 - The economic development implication: innovate or wither.

Where Does Innovation Come From?

- Existing base
 - Process Innovation—product rejuvenation
 - Product Innovation—product transformation
 - Disruptive Technologies—product replacement (the hoped for gazelles)
- Economic erratic—economic development attraction

Schumpeter's 5 New Combinations : What did Schumpeter really write?

1. The introduction of a new method of production...
2. The introduction of a new good ... or a new quality in a good.
3. The opening of a new [geographical] market...
4. The conquest of a new source of raw materials or half-manufactured goods...
5. The carrying out of the new organization of any industry. ...it is not essential ... that the new combinations should be carried out by the same people

What is creative destruction? The redeployment of assets to a new combination of production

Meaning of Creative Destruction

Support must be given all aspects of Schumpeter's "new combinations of capital" in the application of an endogenous development strategy

- Cost savings
- Product rejuvenation
- Product transformation
- Disruptive technology—new product classes

Type of Innovation

- Process innovation
 - Improves productivity
- Market innovation
 - Extends the reach of existing products
- Product development and deployment
 - Refreshes product lines
 - *Technology Pull*
- Technology innovation
 - Create new products classes and industries
 - *Technology Push*

Time to Impact

immediate



immediate



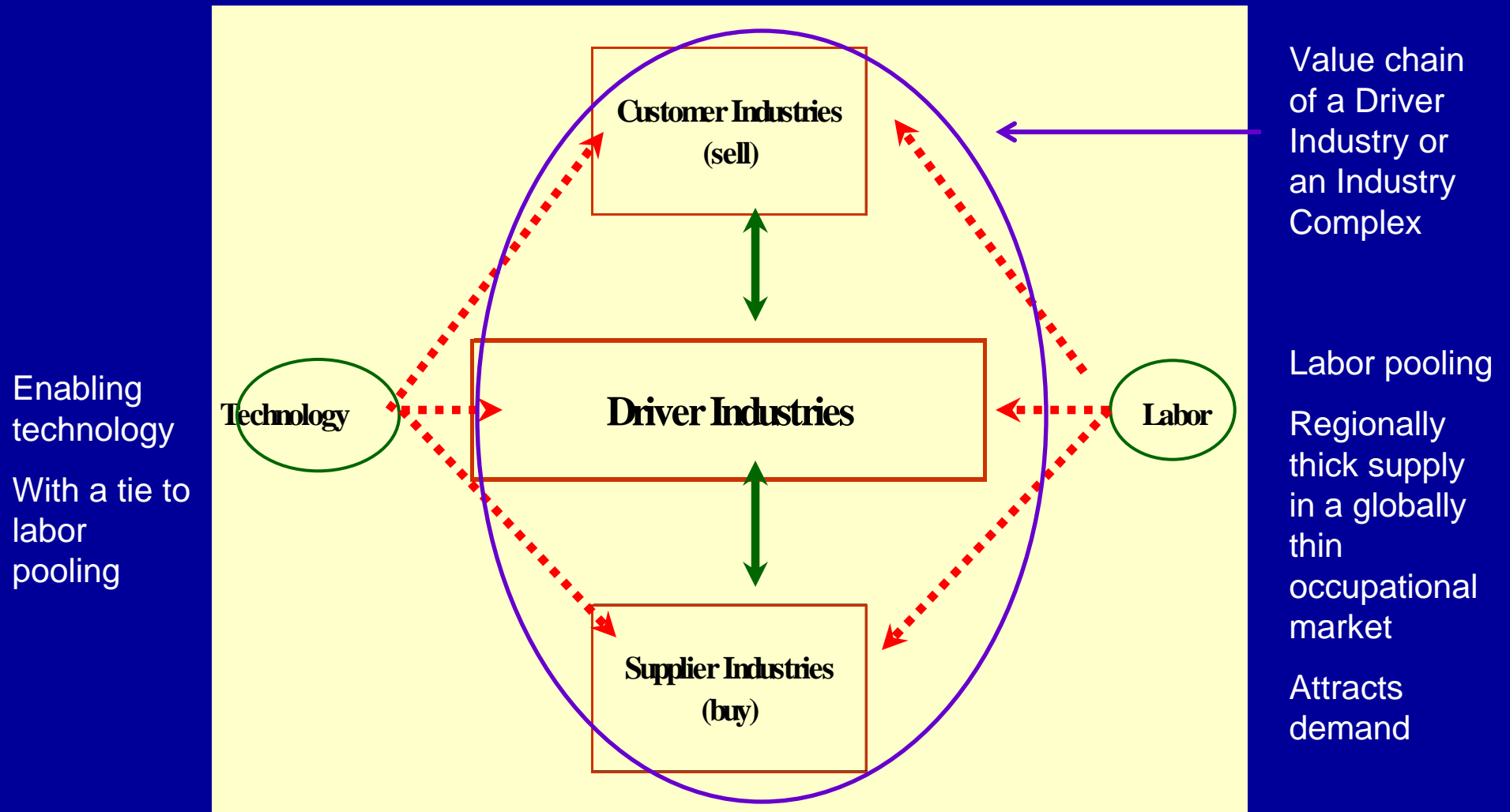
intermediate



long term



Structure of an Industry Cluster



Universities and Economic Development: Findings

1. Excellence in academic doctoral research programs is associated with accelerated rates of employment and per capita income growth.
2. Positive economic spin-offs from academic research in science and technology fields are enhanced if the research institution is located in a metropolitan area.
3. Selective research excellence is difficult, but possible, to achieve.
4. There is a strong correlation between the quality scores of the research fields that we examined.

Universities and Economic Development

Five potential sources of competitive advantage (the popular view)

1. New products—assumed to be new driver industries
2. Technology transfer and regional technology advantage (assumed to be done formally, most often accomplished through labor)
3. Research as an export: research is the driver (often omitted from the literature)
4. Specialization in scarce and thin pools of labor
5. Education as an export product

Our assessment: Impacts are most likely in the reverse order

Three observations on innovation and regional economies

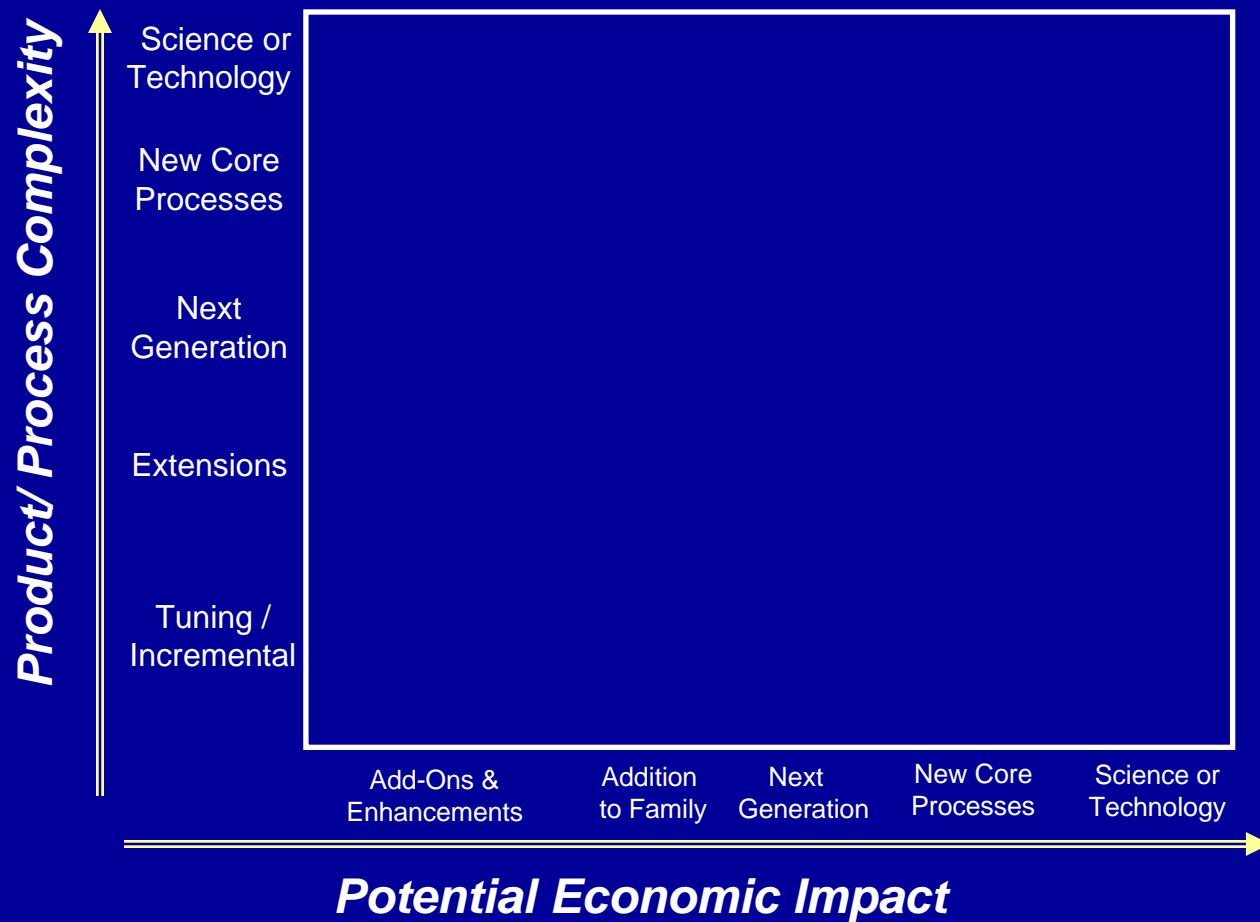
1. Role of catalytic private technology firms that spin-off companies is under-appreciated
2. There is a science and technology business that has experienced an outward shift in demand for all five products in the university product set during the 1990s
3. Regional competitive advantage on the supply side of these product markets was established through decades of patient investment

Who are the Innovators?

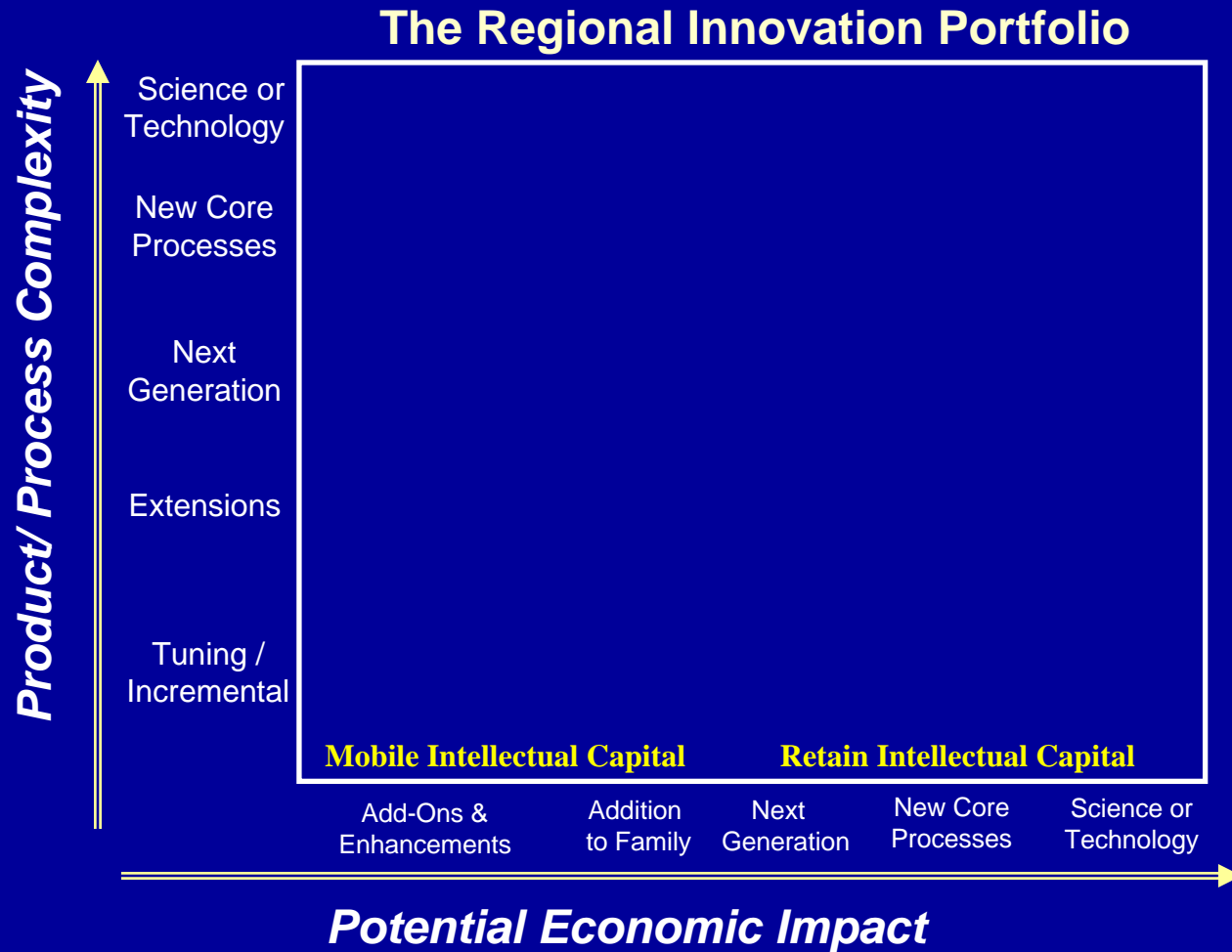
- Myth and reality
- The case of disruptive technologies

Thinking about Innovation

The Regional Innovation Portfolio

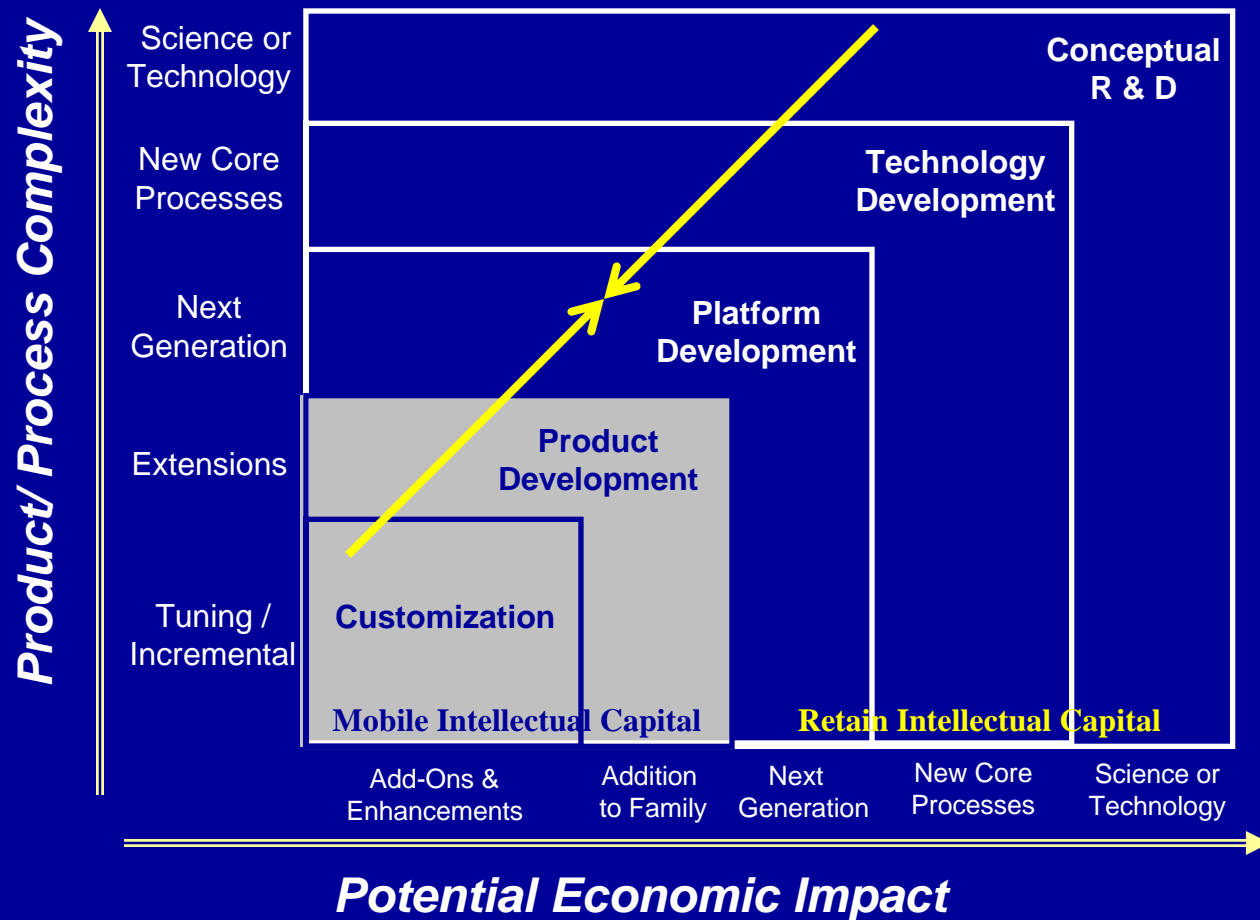


The Regional Innovation Portfolio



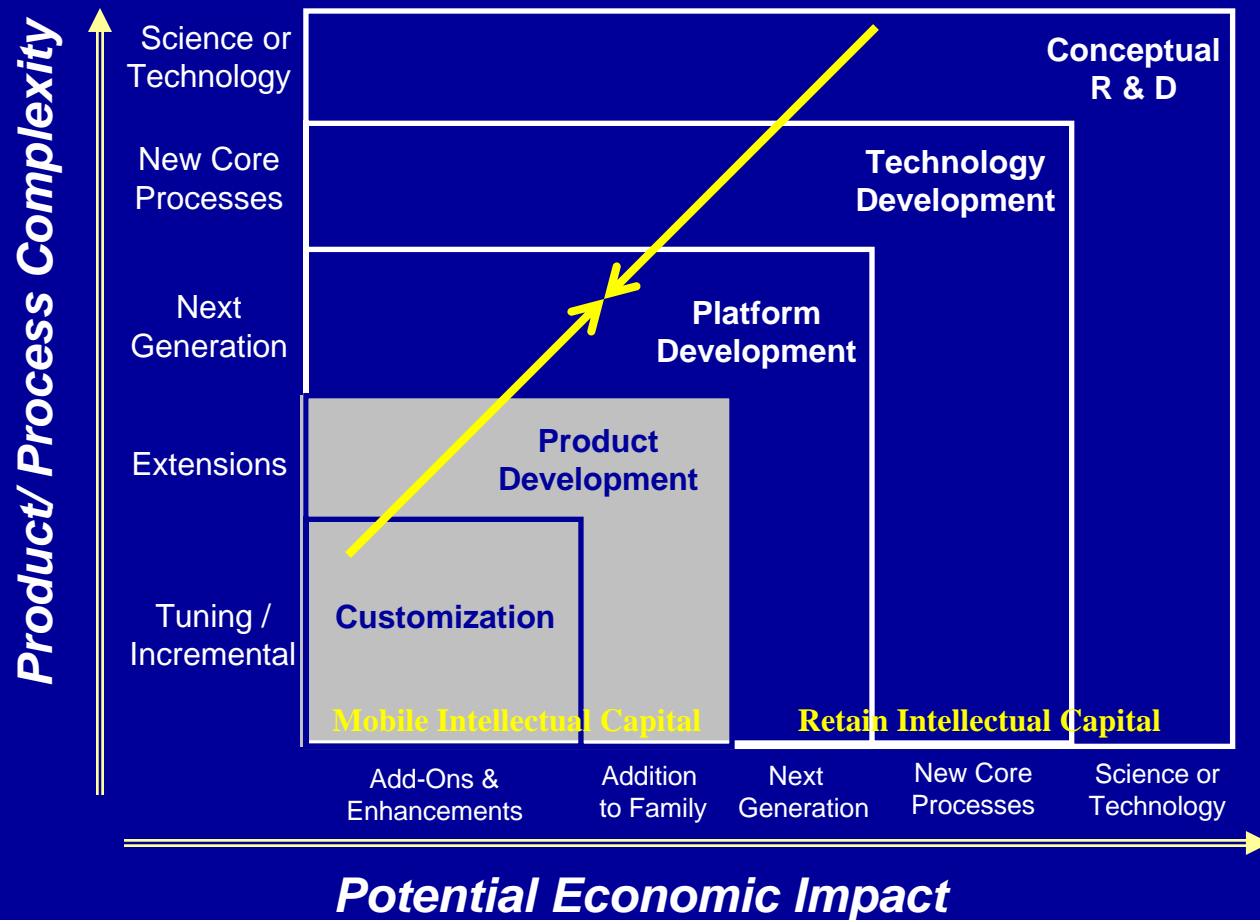
Successful regions and organizations fight commoditization. They retain their intellectual capital

The Regional Innovation Portfolio



Successful regions and organizations fight commoditization. They retain their intellectual capital

The Regional Innovation Portfolio

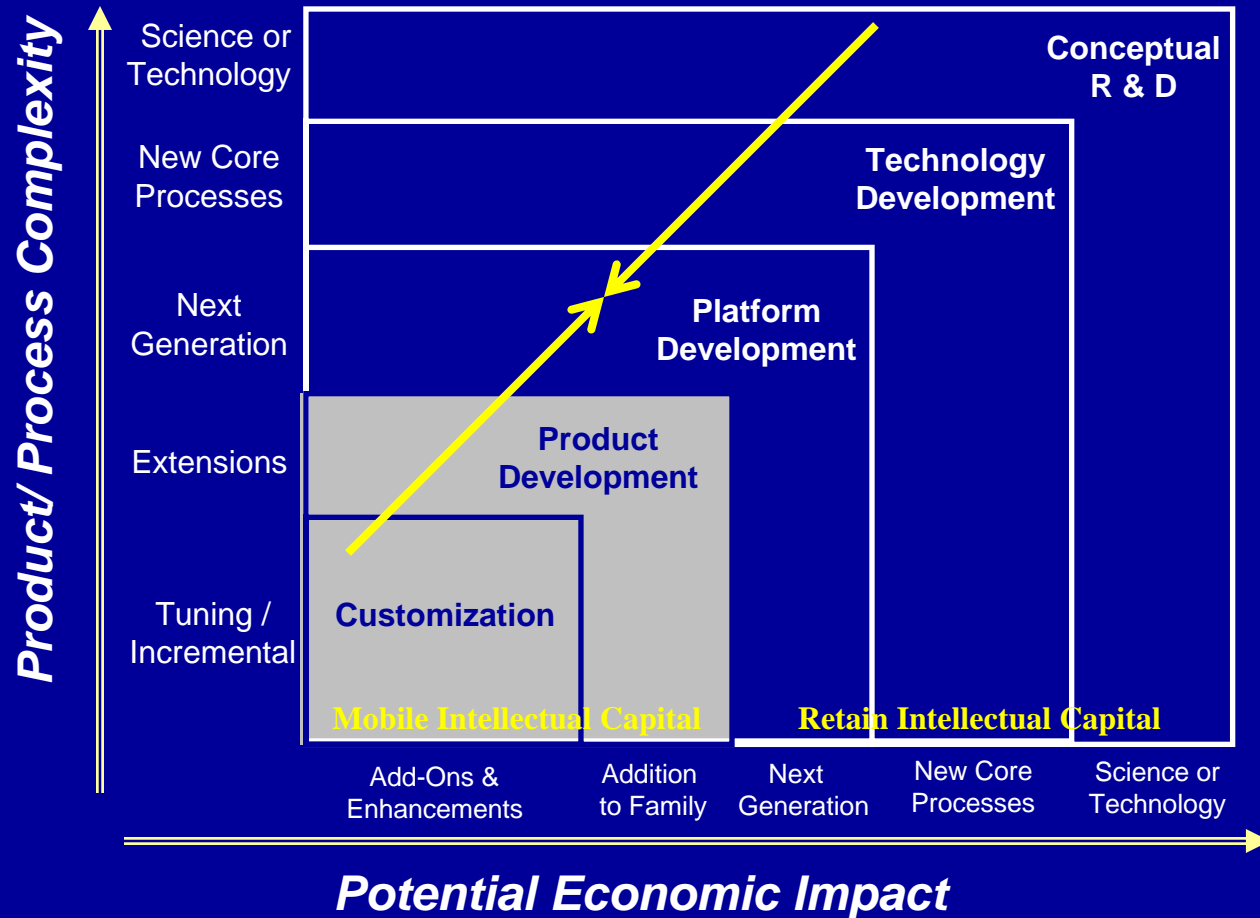


Four Lessons

1. Region's change their growth trajectory through product mix
2. Firm-level decisions on product investment determines regional product mix
3. Regional product-centered economic development strategies should represent a balanced portfolio of investments
4. Identify market failures in product development and change management

Successful regions and organizations fight commoditization. They retain their intellectual capital

The Regional Innovation Portfolio

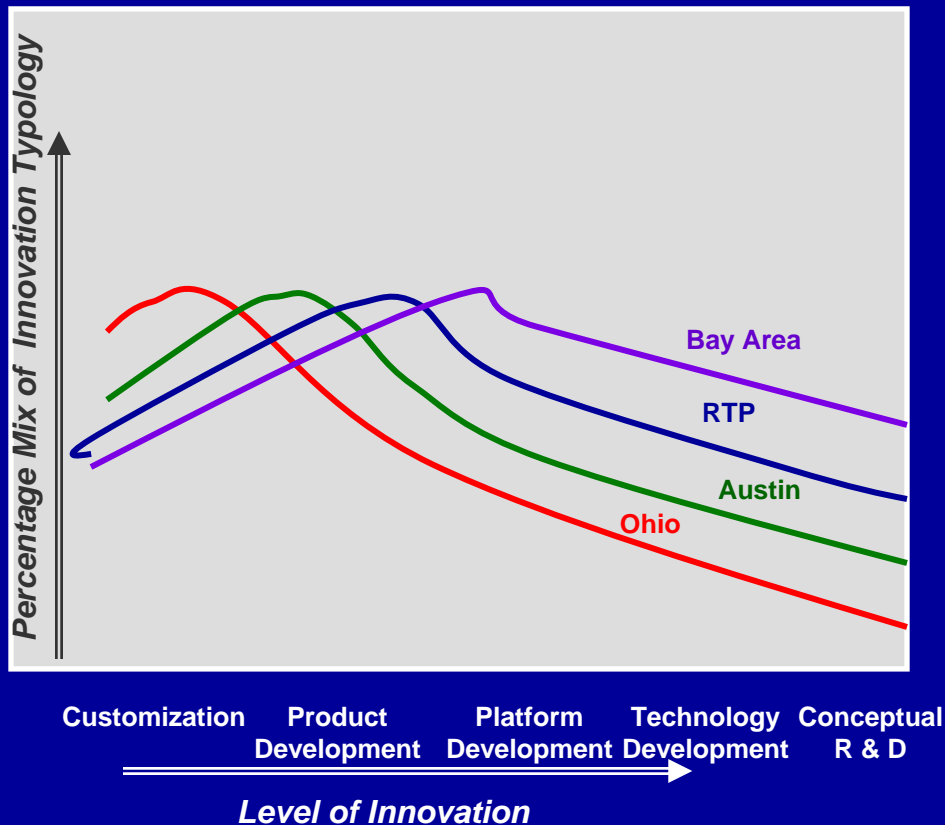


An Endogenous Development Portfolio

Portfolio focuses on product development through a portfolio of technology push and pull. Growing local competitive capacity that combines: **Industry-creating potential** of:

- **Disruptive technology** through conceptual research and technology development,
- **Revitalization** of firms & economy through technology development
- **Evolutionary change** that comes from new platform development and market extensions,
- **Product line vitalization** derived from product development and managerial improvements, with the
- **Market share growth** through Customer responsiveness of product customization.

Think of product mix as an investment portfolio



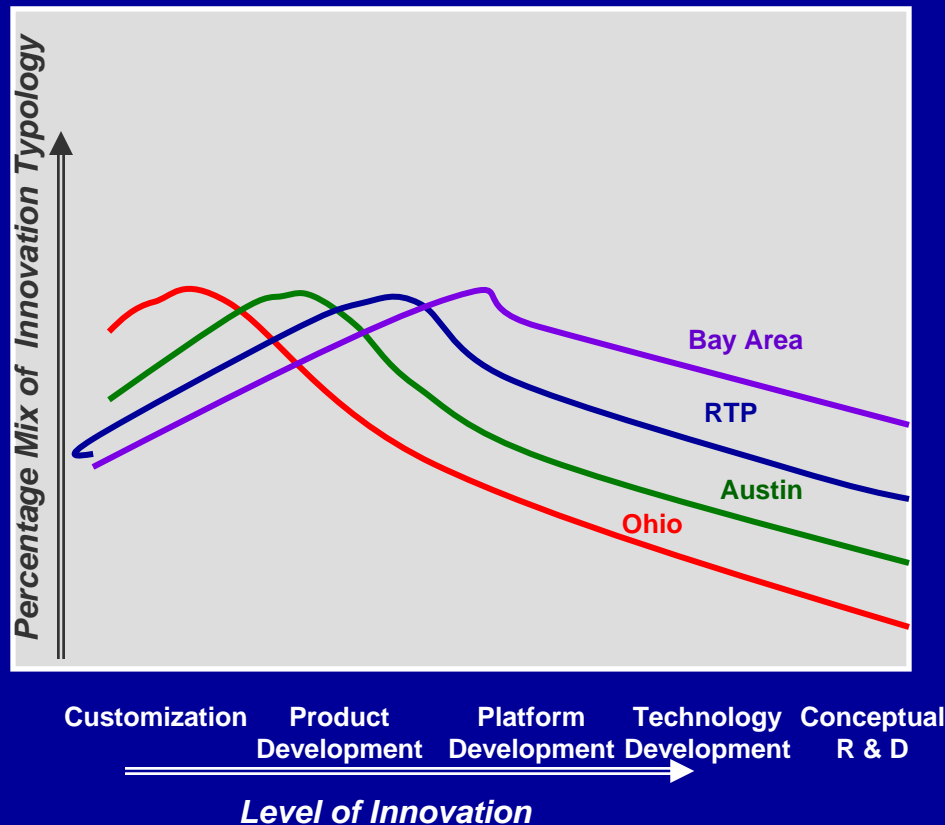
The optimal portfolio for a diversified, mature, regional economy will have a portfolio peak similar to the line represented by "Austin." With the average company involved in product development, demonstrating significant weight on both ends of the spectrum. The mix of the portfolio has a direct effect on innovations ability to impact:

- A. Economic Impact
- B. Types of Jobs
- C. Growth Engine
- D. Retention

Through product sales and productivity growth

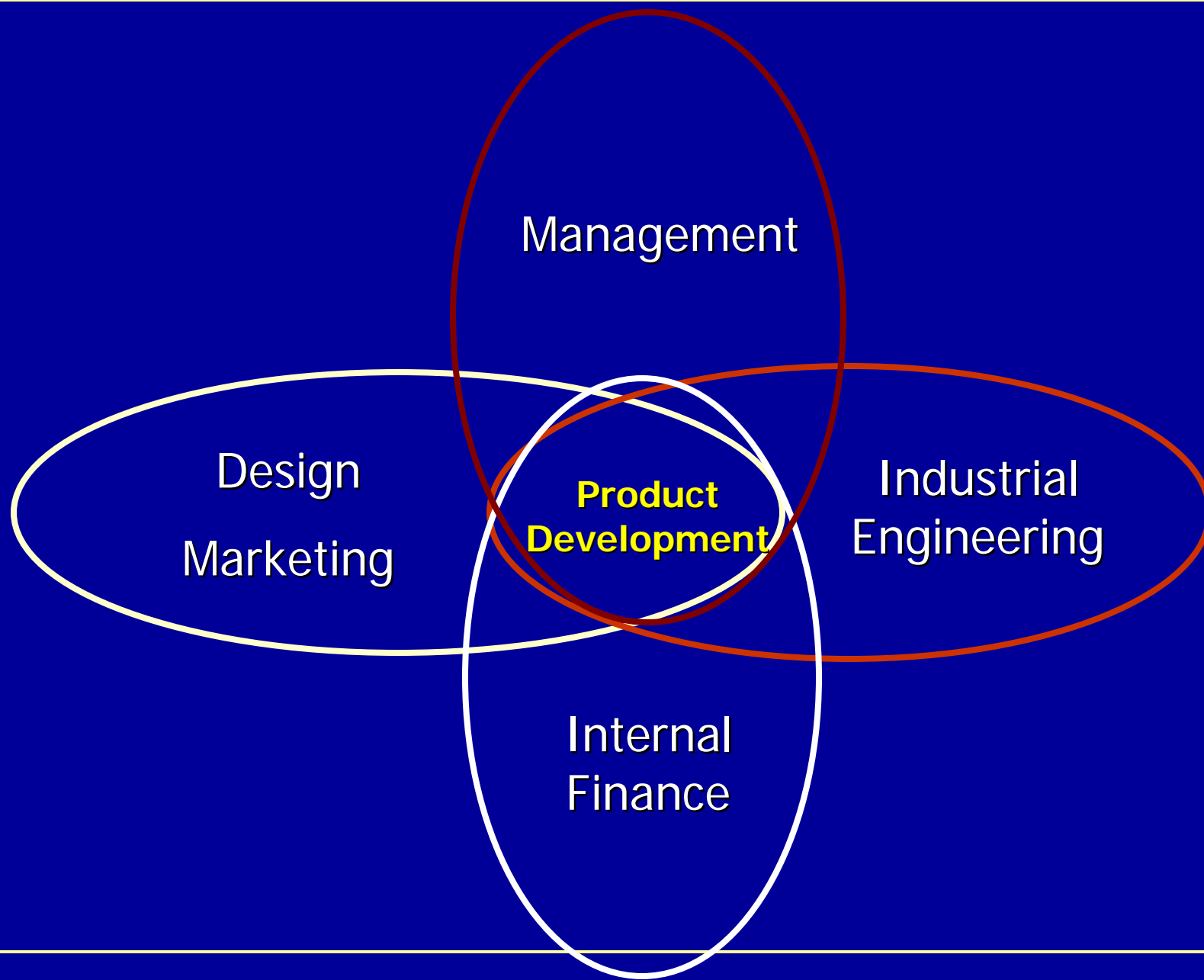
Think of product mix as an investment portfolio

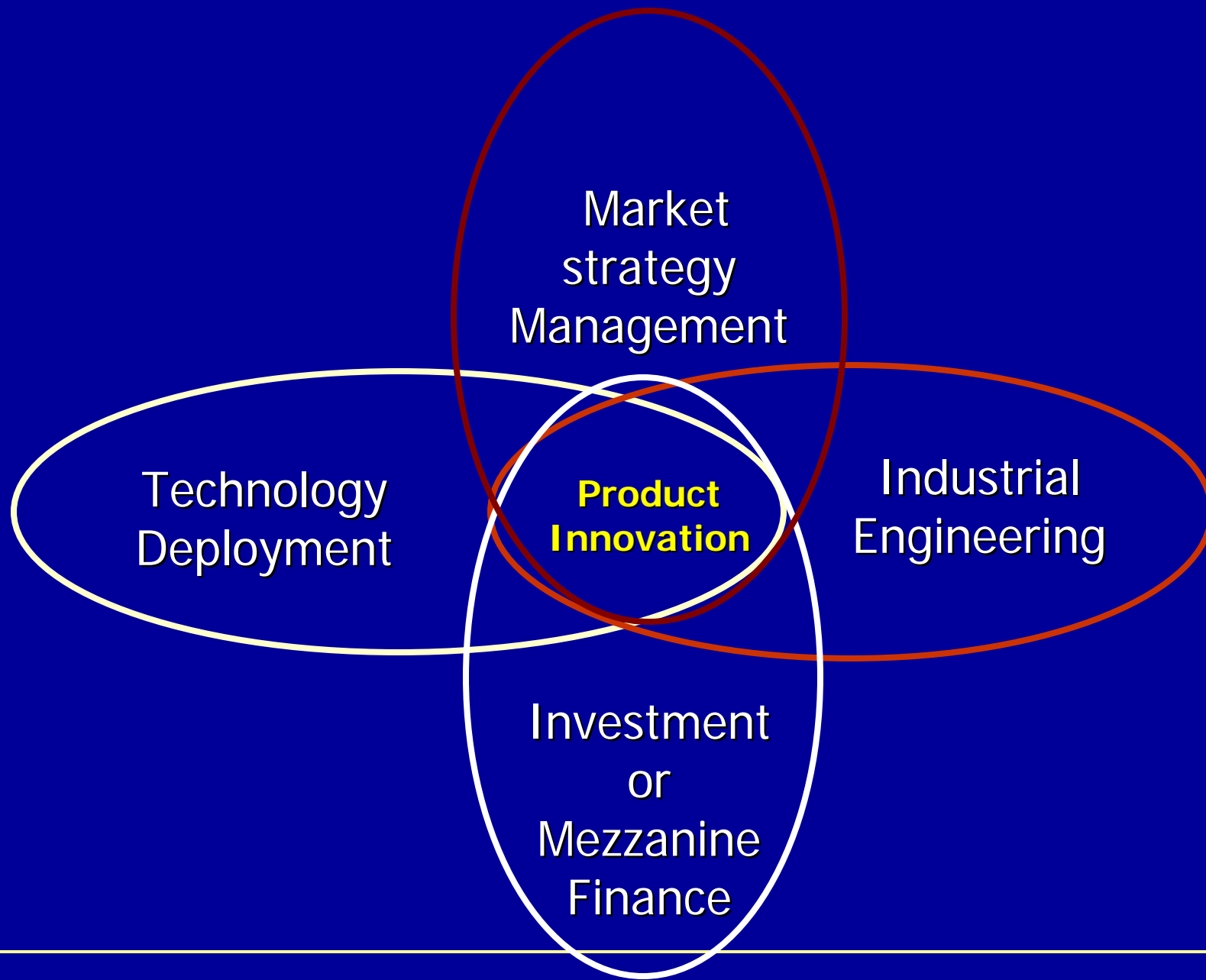
Lessons

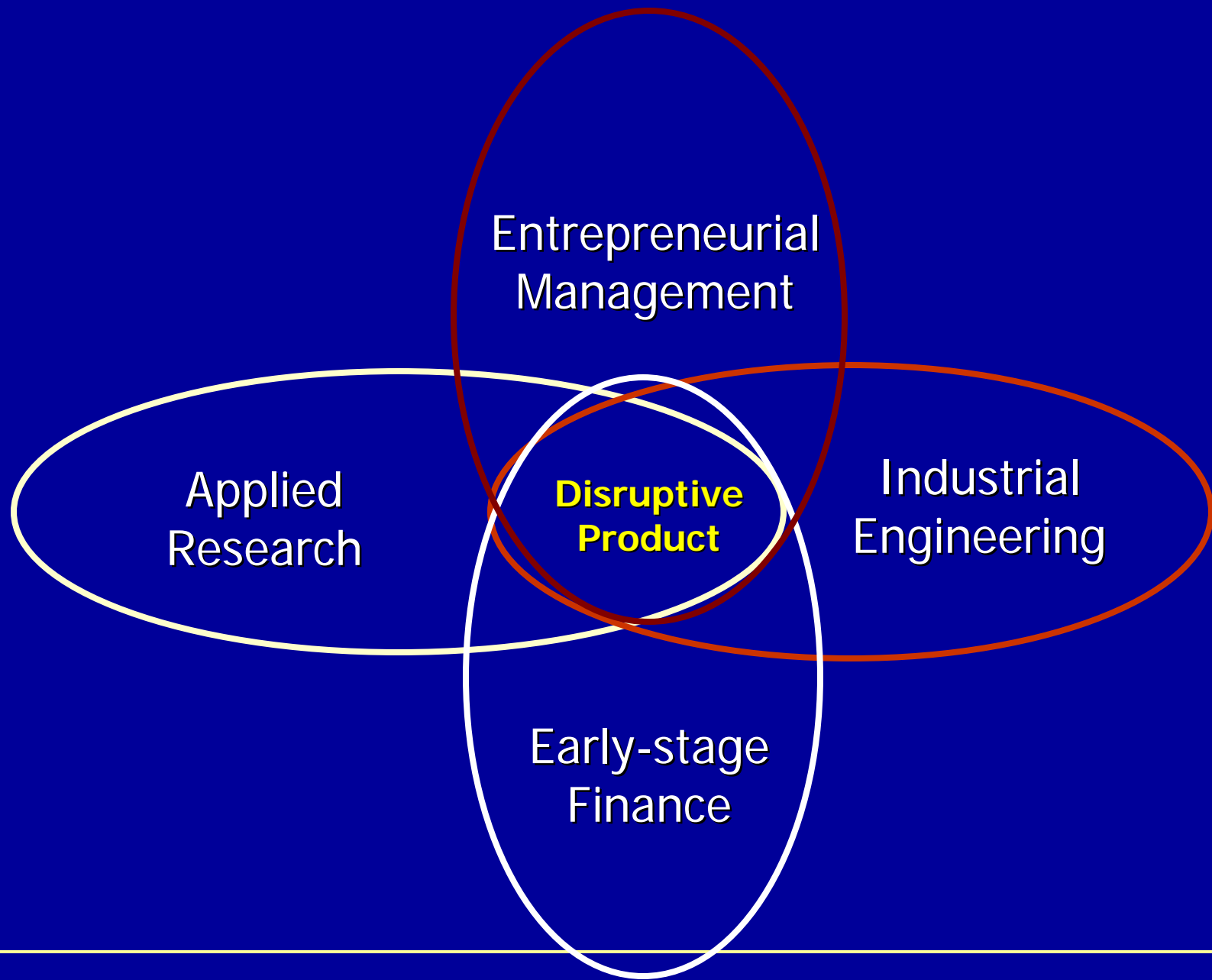


The intersection of a firm's business strategy (competitive advantage) and a region's economic development investment strategy (comparative advantage) takes place in the firm's cash statement.

If the region does not make a unique contribution to maximizing the top line or to minimizing some of the middle lines—the business is only attached to the region through the value of the personal investment of the decision makers in the region.







Why innovation-based economic development investments?

- Low probability-high return part of the portfolio
- Emphasis on disruptive technology innovation or pure science

What makes for a successful innovation portfolio? Combination of push and pull technology strategies

- **Technology push**—where technology pushes products and they can either disrupt markets or be incremental and market-reinforcing
- **Technology pull**—where products pull technology into the marketplace
- Technology pull works from industry-based competitive advantage
- Technology push most likely works from resource based regional comparative advantage (supply-side of the factor markets)

Three economic questions about innovation

- Is the region a perpetual innovation machine?
 - If yes, the new knowledge becomes the exported product, and externally generated research money is an important source of final demand. In this case the region will have a comparative advantage in the new knowledge business.
- Is the region a center for a technology-based nascent industry or set of products?
 - The region is competing for the rewards that accrue over that new industry's or product's life cycle. This is a low probability event but one with potentially high reward and an example of a region earning a competitive, or absolute, advantage in the new industry and earning economic rents that will be slowly competed away over the life cycle.
- Do science and technology investments stimulate process and product innovations in the region's existing economic base?
 - If they do, then the existing economic base can be reinvigorated, in some sense restarting the product cycle.

Where is the market failure?

Science and engineering or markets and business?

- There are technology and science special interest groups that have translated market and business failures into engineering and science failures
- What are the product development market failures?
 - Capital: How do you securitize product development finance?
 - Knowledge: How do small- and mid-sized firms manage continuous product innovation without blowing up their balance sheets?

Five categories of companies

1. **Product *innovators*** — Grow the top line of their cash statement **without blowing up their cost structure**. Can manage continuous product innovation and own intellectual property or have proprietary knowledge
2. **Process innovators and global *competitors*** — **Manage** the middle of their cash statements and ride their product catalogs. Have deployed IT to tighten supply and customer chains. Developing global supply chain.
3. ***Lifestyle firms*** — Goal is not growth but owner's control and earning target income. Are **not profit maximizers**. Frequently have no intellectual property or proprietary competitive advantage.
4. ***One trick ponies*** — Commodity business **dependent** on a single business or production **relationship**
5. ***Dead and dying companies*** — Job shops in auction markets

A balanced innovation portfolio should help move Category 3 firms up to category 1 or 2